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foria; but the birds of New York, Illinois, Florida, Arizona and Idaho have also received visits from me. Favorable opportunities enabled me to add to my collection of nests and eggs a larger proportion of personally taken species and subspecies than is commonly the privilege of an oologist. A set of Spotted Owl, taken in San Diego County, March 24, 1884, is the most highly prized of any set in my collection. Most oologists, however, might consider as of greater value my Condor egg or either one of the following nests accompanied by beautifully marked sets of eggs: Everglade Kite, Golden Eagle, Farallon Rail. My collection of bird skins, nests and eggs is willed to the California Museum of Vertebrate Zoology.

The most important capture of my life, is Mrs. Ingersoll, formerly Miss Laura I. Stevens, of Sacramento, California.

ALBERT MILLS INGERSOLL.

San Diego, California, January 18, 1919.

NOTES ON THE BREEDING HABITS OF THE RED CROSSBILL IN THE OKANAGAN VALLEY, BRITISH COLUMBIA

By J. A. MUNRO

THE FOLLOWING notes apply chiefly to a small section of timbered country close to Okanagan Landing, its topography being the familiar Okanagan type of low mountain covered with Douglas fir and yellow pine, including both original forest and second growth.

Red Crossbills (*Loxia curvirostra minor*) were present in unusually large numbers during the year 1918, and in order to compare their relative abundance with other years, a synopsis of my field notes, taken since 1911, is included.

These birds were fairly common on December 14, 1911, in yellow pine country near Okanagan Landing. A series of males collected on this date had the sex organs enlarged, but no mated birds were seen. It is probable that these birds remained until the following spring, but as no special interest was taken in them at the time, no attempt was made to keep a record of their movement as was done in subsequent years. The only record for 1912 was made on March 13, when a flock of fifteen birds was seen at Nahun, fifteen miles south of Okanagan Landing on the west side of the lake. A small flock was seen several times in the same district at an altitude of 4000 feet during the first week of December, 1913.

No other records were made until July 21, 1915, when a small flock was seen at Okanagan Landing, probably their first appearance for that year. As this locality was being carefully worked at the time it is unlikely that they would have escaped observation, had they arrived before this. A female taken on August 5, and another taken on August 18, had the worn abdominal patch of breeding birds and a third female in breeding condition, was taken on February 24, 1916. This small flock was seen at intervals until April 20, 1916, which was the last date on which Crossbills were observed until the big year 1918, when they were first noted on January 9. They were seen daily there-

after in gradually increased numbers until the maximum was reached about February 15, when there were at least six hundred birds inhabiting an area of approximately three square miles.

At this time when bird-life was relatively scarce it was possible to devote much of my leisure to their study. There had been a heavy crop of yellow pine and Douglas fir seeds (these are the only conifers in this area) and possibly this might account for their unusual abundance and their long stay.

During the cold weather of January and the early part of February, before there was any sign of mating, the birds remained in flocks of from ten to thirty in the heavily foliated conifers. As they were usually silent they would often have escaped notice had it not been for the presence of the winged seeds scattered broadcast on the snow, each with the kernel neatly cut out, and for various methods used for exciting the birds. An imitation of the Pygmy Owl call brought them at once and they would circle over the tree tops in their eagerness to locate their enemy. When the sound was located they would fly from tree top to tree top near the source of the sound, uttering their sharp alarm note until the calling ceased, when they would disappear into the forest again.

Dissection of a series of males collected on February 19, showed the sex organs to be in various stages of development from 1 mm. to 5 mm. in length. Males in the red, the yellow, and the mixed red and yellow plumages, were found to be in breeding condition, and others in similar plumage shot on the same day were undeveloped sexually, or nearly so. No evidence as to the age of the birds could be deduced from the sex organs then, nor did comparison of the skull granulation help.

While a discussion of moults will not be attempted in this paper it might be of interest to state that specimens were taken which plainly show a reversion to the yellow plumage from the red.

The first mated birds and the first nuptial flight were seen on February 19. Four or five birds at a time were frequently seen after this, chasing one another in circles around the tree tops and singing on the wing. Their song came as a delightful surprise in the silent snow-clad woods. Heard through a medium of clear frosty winter air, the song seemed to have the same fine quality as that of the Townsend Solitaire; a less sustained effort and lighter in tone, but with equal carrying power. As the mating season progressed, the song gained in volume and quality, until, by the end of March, it was common to hear the birds sing for twenty minutes at a time, I decided that it was the equal, in every way, of that of the solitaire, with all of the volume and sweetness of the latter's song.

In March, the courtship period being over, there was none of the chasing and singing on the wing observed in February. Solitary males sang from the topmost twig of the tallest tree, frequently a solitary yellow pine towering above the second growth firs. Often three or four birds could be heard at once—a most delightful chorus. In singing the bill is pointed straight up, chest expanded and breast, head, and flank feathers puffed out until the singer looks much larger than he really is. In the early morning the birds sang continuously, evidently serenading their sitting mates, and the song could be clearly heard on a still day at two hundred yards.

In searching for nests, it was soon found that the Pygmy Owl call would be of no service as the males would come from any distance, up to a quarter

of a mile, and in the heavy timber it was impossible to follow them with the eye on their return journey. The only methods that proved successful were to find a singing male and use the tree he perched in as a base, or else to walk slowly through the woods watching for birds carrying nesting material.

Several good prospects were located by these methods, but they were in trees that were impossible to climb. An abortive attempt at nest building was observed on March 1. This was on the top of a ridge overlooking Okanagan Lake where there were a number of second growth firs in small groups. In this case, a red male was seen at the top of a thirty-foot heavily foliated fir, and as I approached he gave the characteristic alarm note, but did not fly. After waiting in concealment for five minutes, a female was seen to fly out from a dense piece of foliage ten feet below the top and disappear in the timber on the hillside. In a few minutes she returned with some nesting material in her bill which she carried to the top of another tree and there dropped. She repeated this a second time and then both birds flew off and did not return during the hour that I remained on the watch.

On March 19, while hunting on the same ridge, a nest in process of construction was found, about one hundred yards distant, and I concluded that its owners were the same pair as had been under observation some two weeks earlier. The nest was saddled on a thin branch near the top of a forty foot Douglas fir about fourteen inches from the trunk and was so well concealed as to be all but invisible from below. The female was under observation for half an hour, while she carried material to the nest, moulding the interior with her body after each trip, while her mate remained at the top of a nearby tree chirping excitedly.

Absence from the district prevented my return to the nest until April 9 and it then contained a newly hatched chick, and two eggs on the point of hatching. The ground color of the eggs was pale bluish green lightly flecked with lavender and with a wreath of lavender and ruddy-brown spots around the larger end. No measurements of the eggs were taken and unfortunately I was not successful in preparing them. The nest which is a very handsome one was presented to the Provincial Museum at Victoria. The body of the nest is composed of black tree moss (*Alectoria jubata*), dry grass and weed stalks; the outside, of fine fir twigs, those selected for the rim being decorated with little tufts of vivid green lichen (*Evernia vulpina*). The inside is well felted with black tree moss and contains a few pieces of fine grass and one breast feather of a Red-tailed Hawk. It is 110 mm. in diameter with an outside depth of 60 mm. and an inside depth of 30 mm.

On March 18, a red male was heard singing from the top of a second growth fir thirty feet high, one of a group on a steep hillside overlooking Okanagan Lake. At my approach he called excitedly until I reached the tree, when he flew some distance away. The nest was in the tree on which the male had been singing and was found without difficulty. It was on a lower branch ten feet above the ground and ten feet out from the trunk, in plain view from the ground. The female was sitting on one egg and did not leave the nest until the limb was shaken as I ascended the tree.

Two more eggs were laid by March 20, and, rather than risk having them destroyed by a squirrel or a Magpie, I collected the nest and the female. On dissecting the bird a fourth egg, too much crushed to preserve, was found in the oviduct. The eggs measure, in millimeters, 15x20, 15x20, 14x19, and are

a pale bluish green sparingly marked with dark brown spots (some of which are smeared) and with small lavender markings principally at the larger ends.

Another nest containing four young a few days old was found on March 18. This was in a tall rugged fir growing on the edge of a rocky bluff. The nest was situated eight feet from the trunk on a stout limb forty feet above the ground and was quite invisible from below. While hunting carefully over this hillside, stopping frequently for ten-minute intervals to watch for crossbills, the very quiet female flew into a tree a few yards from me and after a wait of five minutes flew directly to the nest. The young were naked save for small patches of filamentous gray down on the head and back. The bill and gape were conspicuously yellow. One of these nestlings was taken and an examination of the stomach showed a mass of softened fir seeds.

With the rush of migrants in the latter part of April and May, my interest in crossbills rather flagged, although it was noted that most of the birds were paired and very quiet. On June 14, small flocks appeared in the fringe of poplars along the lake shore in front of my house. This piece of brush is under almost daily observation and no crossbills had ever been seen there before. They were feeding on green choke-cherries and tiny salmon-colored lepidopterous larvae that crawled on the under sides of the poplar leaves. To reach these the birds hang head downward in the position they often assume when extracting fir seeds from the cones.

All day long small flocks were flying up and down the road and alighting in the trees. It is likely that they were moving to new feeding grounds as none were seen the next morning or during the days following. Probably sixty birds were seen during the day. Of these at least forty were red males in the moult and the rest were adult females and juvenals in the striped plumage.

Okanagan Landing, British Columbia, January 21, 1919.

NOTES ON THE NESTING OF TWO LITTLE-KNOWN SPECIES OF PETREL

By GEORGE WILLETT

WHILE stationed on Laysan Island, Hawaiian Archipelago, during the winter of 1912-13, I was much interested in observing the nesting habits of two species of petrel, *Pterodroma hypoleuca* and *Oceanodroma tristrami*. As I have never seen a published description of the nest and eggs of either of these birds, the following notes may be worth recording.

The White-breasted Petrel (*Pterodroma hypoleuca*) is an abundant nesting bird on Laysan, Lisianski and Midway islands, Pearl and Hermes Reef, and French Frigate Shoal. It is the most abundant nesting bird on the Hawaiian Bird Reservation, there being on Laysan Island alone, probably not less than 50,000 pairs. It was already present on the island at the time of our arrival, December 22, 1912, and from this time until January 7 following, the air at night fairly swarmed with the birds. After this date, while still abundant, the numbers in the air decreased considerably as the birds began to incubate their eggs. Laying commenced the first week in January and was at its height about January 20.